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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,558	04/23/2001	Robert L. Gerlach	F070	4812

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EXAMINER	
GURZO, PAUL M	

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/840,558	GERLACH ET AL.	
	Examiner	Art Unit	
	Paul Gurzo	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-7,10-13,22 and 27* is/are allowed.

6)☒ Claim(s) *8,9,14,15,20,21,23-26 and 28-35* is/are rejected.

7)☒ Claim(s) *16-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 recites the limitation "electrostatic deflector" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8,14,20,21,23,24,26,29, and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krijn et al. (6,455,848).

Regarding claim 8, 848 teaches a scanning electron microscope comprising a primary beam column for forming a primary electron beam column including a high resolution objective lens (8) for forming a primary beam and scanning the beam across a specimen (14) to cause emission of secondary electrons including Auger electrons and a secondary electron optical system for collecting Auger electrons through the objective lens. They teach a deflector (26) for deflecting the secondary electrons from the path of the primary beam (30) and an electron energy

analyzer (not shown) for analyzing the Auger electrons (col. 1, lines 59-63, col. 4, lines 20-23, col. 7, lines 15-60, and Fig. 4). They do not explicitly state that this detector is an analyzer, but they state that "In order to detect the energy variation of the Auger electrons, use can be made of special, known Auger detectors which are capable of separating the spectrum of the Auger electrons from the spectrum of the backscatter electrons" (col. 1, line 59-63). They go on to teach that the "apparatus of the kind set forth in the introductory part of claim 1 in which Auger images of the sample can be formed without seriously degrading the spatial resolution by the selection of the Auger energy range" (col. 2, lines 44-46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to analyze the electrons to lead to greater measurement precision.

Regarding claim 14, it is obvious that the prior art teaches the use of a snorkel lens because it achieves the same results as the prior art.

Regarding claims 20, 21, and 29, 848 teaches a scanning electron microscope comprising a primary beam column for forming a primary electron beam column including a high resolution objective lens (8) for forming a primary beam and scanning the beam across a specimen (14) to cause emission of secondary electrons including Auger electrons and a secondary electron optical system for collecting Auger electrons through the objective lens. They teach a deflector (26) for deflecting the secondary electrons from the path of the primary beam (30) and an electron energy analyzer (not shown) for analyzing the Auger electrons (col. 1, lines 59-63, col. 4, lines 20-23, col. 7, lines 15-60, and Fig. 4). They do not explicitly state that this detector is an analyzer, but they state that "In order to detect the energy variation of the Auger electrons, use can be made of special, known Auger detectors which are capable of separating the spectrum of

the Auger electrons from the spectrum of the backscatter electrons" (col. 1, line 59-63). They go on to teach that the "apparatus of the kind set forth in the introductory part of claim 1 in which Auger images of the sample can be formed without seriously degrading the spatial resolution by the selection of the Auger energy range" (col. 2, lines 44-46). They also teach a focusing device forms an end focus of the primary beam in the vicinity of the sample holder for a sample to be irradiated (col. 4, lines 34-36), and this teaches on the claimed resolution values.

Regarding claims 23 and 24, 848 teaches a scanning electron microscope comprising a primary beam column for forming a primary electron beam column including a high resolution objective lens (8) for forming a primary beam and scanning the beam across a specimen (14) to cause emission of secondary electrons including Auger electrons and a secondary electron optical system for collecting Auger electrons through the objective lens. They teach a deflector (26) for deflecting the secondary electrons from the path of the primary beam (30) and an electron energy analyzer (not shown) for analyzing the Auger electrons (col. 1, lines 59-63, col. 4, lines 20-23, col. 7, lines 15-60, and Fig. 4). They do not explicitly state that this detector is an analyzer, but they state that "In order to detect the energy variation of the Auger electrons, use can be made of special, known Auger detectors which are capable of separating the spectrum of the Auger electrons from the spectrum of the backscatter electrons" (col. 1, line 59-63). They go on to teach that the "apparatus of the kind set forth in the introductory part of claim 1 in which Auger images of the sample can be formed without seriously degrading the spatial resolution by the selection of the Auger energy range" (col. 2, lines 44-46). They also teach the objective lens (8) creates a magnetic field (col. 5, line 67 - col. 6, line 4) and voltage application for defection (col. 4, lines 11-13).

Regarding claims 26 and 33, 848 teaches a method of performing Auger electron spectroscopy using a high resolution scanning electron microscope, comprising directing a beam of primary electrons (30) through an objective lens (8) toward a specimen surface (14), collecting Auger electrons through the objective lens (8), and analyzing the energy of the Auger electrons as stated above. The Examiner reads a virtual image to be an electron image formed by converging the electrons (see arguments dated 2/8/04, page 12, paragraph 4). 848 teaches acquiring an image of the sample (14) by means of Auger electrons extracted from the sample and traveling in the direction opposing the direction of the primary beam (30). Therefore, this will form an image of the virtual Auger source off the path of the primary beam. They do not explicitly state that this detector is an analyzer, but they state that "In order to detect the energy variation of the Auger electrons, use can be made of special, known Auger detectors which are capable of separating the spectrum of the Auger electrons from the spectrum of the backscatter electrons" (col. 1, line 59-63). They go on to teach that the "apparatus of the kind set forth in the introductory part of claim 1 in which Auger images of the sample can be formed without seriously degrading the spatial resolution by the selection of the Auger energy range" (col. 2, lines 44-46). They also teach a focusing device forms an end focus of the primary beam in the vicinity of the sample holder for a sample to be irradiated (col. 4, lines 34-36). Further, it is obvious that will be converged near the entrance of the secondary electron analyzer so that the image of the Auger electrons is achieved.

Regarding claim 32, 848 teaches beam energy of 50 eV to 5 keV (col. 1, lines 49-51).

Regarding claim 34, 848 teaches an objective lens (8) which is an optical element that helps to focus the secondary electrons.

Regarding claim 35, 848 teaches a scanning electron microscope comprising a primary beam column for forming a primary electron beam column including a high resolution objective lens (8) for forming a primary beam and scanning the beam across a specimen (14) to cause emission of secondary electrons including Auger electrons and a secondary electron optical system for collecting Auger electrons through the objective lens. They teach a deflector (26) for deflecting the secondary electrons from the path of the primary beam (30) and an electron energy analyzer (not shown) for analyzing the Auger electrons (col. 1, lines 59-63, col. 4, lines 20-23, col. 7, lines 15-60, and Fig. 4). They do not explicitly state that this detector is an analyzer, but they state that "In order to detect the energy variation of the Auger electrons, use can be made of special, known Auger detectors which are capable of separating the spectrum of the Auger electrons from the spectrum of the backscatter electrons" (col. 1, line 59-63). They go on to teach that the "apparatus of the kind set forth in the introductory part of claim 1 in which Auger images of the sample can be formed without seriously degrading the spatial resolution by the selection of the Auger energy range" (col. 2, lines 44-46). They also teach a focusing device forms an end focus of the primary beam in the vicinity of the sample holder for a sample to be irradiated (col. 4, lines 34-36). Further, it is obvious that will be converged near the entrance of the secondary electron analyzer so that the energy variation detection of the Auger electrons is achieved.

Claims 9 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krijn et al. (6,455,848), in view of Schmitt et al. (5,847,399).

Regarding claims 9 and 28, the above-applied prior art does not explicitly teach the use of a shield. However, 399 teaches the use of an objective lens (5) as well as a shield (61) that

shields the primary beam from the field (col. 3, line 34 - col. 4, line 9 and Fig. 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a shield with desired qualities because this will prevent destructive current and field effects.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krijn et al. (6,455,848) in view of Todokoro et al. (6,310,341).

Regarding claim 15, the above-applied prior art does not teach the use of dual pole magnetic lens. However, 341 teaches the use of a first and second magnetic pole lens (401 and 402) that is disposed within the lens assembly (col. 7, lines 14-61 and Fig. 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use these magnetic poles so that the electron beam path can be adjusted for higher electron transmission.

Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krijn et al. (6,455,848) in view of Gerlach (4,806,754).

Regarding claims 30 and 31, the above-applied prior art does not teach the use of a spherical capacitor, but 754 demonstrates the use of one as an energy analyzer for charged particle (col. 2, lines 41-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this capacitor because it is well known in the art and achieves the claimed results.

Allowable Subject Matter

Claims 1-7, 10-13, 22, and 27 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to the independent claim 1, as claimed invention was read in light of the specification, the prior art of record fails to teach the claimed use of an electrostatic capacitor as well as a shield that is conductive on the inside to shield the primary beam and having a potential gradient on the outside to create an external field related to the electric field of the electrostatic capacitor to reduce distortion of the field of the capacitor caused by the shield. With respect to independent claims 10 and 11, as claimed invention was read in light of the specification, the prior art of record fails to teach a shield that shields the primary beam from the field and that is conductive on the inside and resistive on the outside to maintain a potential gradient on the outside corresponding to the field of the deflector. With respect to the independent claim 22, as claimed invention was read in light of the specification, the prior art of record fails to teach the collection efficiency being greater than twenty percent for Auger electrons having an energy of 100 eV. With respect to the independent claim 27, as claimed invention was read in light of the specification, the prior art of record fails to teach forming an image of the virtual Auger source off the path of the primary beam using an electrostatic capacitor.

Claims 16-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not teach the use of a magnetic field generating coil, electrostatic deflection plates, movable pole pieces, or sample movement.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Gurzo whose telephone number is (571) 272-2472. The examiner can normally be reached on M-Fri. 7:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached at (571) 272-2477. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PMG
March 11, 2004

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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